

**Consumption of sexually explicit internet material and its effects on minors' health:
latest evidence from the literature**

Niccolò PRINCIPI¹, Pietro MAGNONI¹, Ludovico GRIMOLDI¹,
Davide CARNEVALI¹, Laura CAVAZZANA¹, Alberto PELLAI^{2*}

¹ *Post Graduate School in Public Health, Department of Biomedical Sciences for Health, University of Milan, Italy;* ² *Department of Biomedical Sciences for Health, University of Milan, Italy.*

* Corresponding author: Alberto Pellai, Department of Biomedical Sciences for Health, University of Milan, Via Pascal 36, 20100, Milan, Italy. E-mail: alberto.pellai@unimi.it



Abstract

BACKGROUND. Nowadays adolescents and children are more and more exposed to sexually explicit internet material (SEIM), but most parents and healthcare professionals neglect this issue. The aim of the present study is to evaluate the impact of online pornography on minors' health with a specific focus on the effects produced on their behavioural, psychophysical and social development.

METHODS. A literature search was performed on PubMed and ScienceDirect in March 2018 with the query “(pornography OR sexually explicit internet material) AND (adolescent OR child OR young) AND (impact OR behaviour OR health)”. Results published between 2013 and 2018 were analysed and compared with previous evidence.

RESULTS. According to selected studies (n = 19), an association between consumption of online pornography and several behavioral, psychophysical and social outcomes – earlier sexual debut, engaging with multiple and/or occasional partners, emulating risky sexual behaviors, assimilating distorted gender roles, dysfunctional body perception, aggressiveness, anxious or depressive symptoms, compulsive pornography use – is confirmed.

CONCLUSIONS. The impact of online pornography on minors' health appears to be relevant. Nonetheless, sex education in schools is not compulsory in Italy at present. The issue can no longer be neglected and must be targeted by global and multidisciplinary interventions. Empowering parents, teachers and healthcare professionals by means of educational programs targeting this issue will allow them to assist minors in developing critical thinking skills about pornography, decreasing its use and obtaining an affective and sex education that is more suitable for their developmental needs.

Key words: Pornography - Adolescent development - Child development

Introduction

Consumption of sexually explicit internet material (SEIM) represents one of the foremost risks for young web surfers. Sexually explicit or frankly pornographic material can often be found in newspapers and magazines, TV shows, music videos. Still, when compared to other media, the web is acknowledged as an even more “sexualised” environment ⁽¹⁾. The number of young users actively searching for or accidentally running into SEIM is growing exponentially. In Italy, the prevalence of exposure to SEIM among 18-year-olds reaches up to 90% for males and 40% for females ⁽²⁾.

This is dramatically changing the way in which minors approach sexuality, as they may easily be exposed to age-inappropriate content in an unprotected setting and without parental supervision ⁽³⁾.

More and more attention has been drawn to the impact of modern technology on the developing sexuality and social skills of young people. The role of media in conditioning their behaviour and self-perception is well-acknowledged and explained by the *Media Practice Model* proposed by Shafer *et al.* ⁽⁴⁾ The web is teaching minors how to express themselves and define their own identity and sexuality. As such, free and mainstream SEIM is acting as a source of information, attitudes and behaviours thus defining the content and dynamics of sexual interactions, gender scripts, and the aspects of consent and violence ^(5,6). This type of content rarely emphasises potential risks related to unprotected sex, including sexually transmitted diseases and unintended pregnancy ⁽³⁾. Furthermore, potential negative consequences on psychophysical and social health have been demonstrated in adults ^(7,8). These may easily be exacerbated in adolescents, who are a vulnerable target at high risk of compulsive use or addiction ⁽⁹⁾.

Despite these worries, the issue is rarely addressed critically. This is in part due to the fact that scientific evidence supporting the negative effects of exposure to SEIM on minors’ sexuality is controversial, and studies addressing this topic are difficult _ because of important methodological discrepancies. The tendency to generalise all pornographic material as fitting into one category does not consider the extreme variety of contents that are available on the web (softcore vs hardcore, amateur vs professional, violent vs non-violent, mainstream vs peculiar categories and possibly

paraphilic content), with several types of audience and implications ⁽¹⁰⁾. Scientific research is also hampered by the sensitiveness of the topic with regard to the protected status of the target. Because distributing pornographic material to minors is made impossible by legal and/or ethical issues, experimental studies are not viable and the only source of information comes from surveys and questionnaires bearing low response rates and important self-selection and recall biases ⁽¹¹⁾. Despite these limitations, the topic has been gaining more and more scientific relevance.

The present study aims at presenting findings of the most recent literature (2013-2018) addressing minors' consumption of SEIM and its impact on health in terms of attitudes and beliefs, body image perception, sexual behaviour and aggressiveness, social development.

Materials and methods

For the present analysis, a literature search was performed in March 2018 on two scientific web search engines (PubMed and ScienceDirect) using the query “(pornography OR sexually explicit internet material) AND (adolescent OR child OR young) AND (impact OR behavior OR health)”. Initial results (n = 1057) were filtered keeping only articles published between 2013 and 2018 (n = 417). Duplicates and studies that were judged to be non-pertinent based on title and/or abstract were removed. Thorough reading of remaining articles (n = 72) allowed to individuate 19 that contained appropriate information. These were included in the analysis and integrated with international surveys about children health and safety. Their findings are hereby presented and compared with previous literature.

Results

The main effect of SEIM consumption is the internalization of distorted beliefs that are in conflict with those acquired and learnt in families and schools. This divergence is entitled to what Peter &

Valkenburg define “sexual uncertainty” ⁽¹²⁾ and may lead minors to develop unrealistic knowledges and notions about sex and misleading attitudes toward interpersonal relationships ⁽¹³⁾. Some adolescents may be able to perform critical thinking skills and acknowledge the imaginary and unrealistic nature of pornography ⁽¹⁴⁾. However, large-scale studies show that as exposure to SEIM increases, so does the perception of SEIM as a realistic and useful source of information about sex that could be used in real life ⁽¹⁵⁾.

Watching SEIM nurtures instrumental (questa parola va cambiata, perchè io non comprendo che cosa volete dire con instrumental: potremmo usare il termine “partial” or “distorted” or “immature” or “not valid”) attitudes toward sex, considered as a source of pleasure, excitement and arousal rather than a life-dimension impacting love and relationship and enhances positive attitudes toward casual sex ⁽¹⁶⁾. The mean age of sexual first experience tends to be younger for adolescents who have been exposed to SEIM, and this would confirm the role of pornography as an “accelerator of sexuality” ⁽¹⁷⁾. A recent Belgian longitudinal study of 639 adolescents shows that frequent SEIM use increases the likelihood of early sexual debut. This effect seems to be greater for adolescents in early pubertal stage compared to their peers in more advanced pubertal stage ⁽¹⁸⁾. Another study performed by Bulot *et al.* (2015) in 812 French university students showed that early exposition to SEIM (at a mean age of 15.2 years) had greatly influenced the mean age of their first sexual intercourse and the likelihood of looking for casual sex partners ⁽¹⁹⁾.

Minors who consume SEIM are notoriously inclined to learn and assimilate the sexual acts they see and engage in potentially risky behaviours ⁽²⁰⁾. In a research by Martellozzo *et al.* for Middlesex University, London (2016), 39% of 12-13 year-olds and 21% of 11-12 year-olds confessed that what they had seen in pornography later influenced their expectations about the sexual practices they would want to experiment ⁽²¹⁾. An American study suggested an association between exposure to SEIM and group sex, anal sex, alcohol or drug abuse during sex ⁽¹⁶⁾. In a retrospective study by Donevan & Mattebo (2017) investigating 370 male adolescents, those who watched SEIM on a daily basis were more likely to have experienced the acts depicted in pornography compared to

occasional viewers (50% vs 17%). This was especially true for oral sex (33% vs 3%) and anal sex (17% vs 0%) ⁽²²⁾. A recent meta-analysis by Smith *et al.* (2016) identified an important association between exposure to SEIM and unprotected sex ⁽²³⁾. This would greatly increase the risk of undesired pregnancy and voluntary interruption of pregnancy ⁽²⁴⁾, as well as sexually transmitted diseases (STDs) to which adolescents are most susceptible. In fact, it is estimated that about 3 million adolescents acquire a STD every year ⁽²⁵⁾.

Pornographic material also seems to reinforce a “hypergendered orientation”, i.e. distorted gender role attitudes based on male dominance and female submission ⁽¹⁷⁾. This phenomenon is tightly linked to sexual objectification of women, who are more likely to be judged on the sole basis of physical appearance, body parts and sexual attitudes and under the assumption that their attractiveness strictly depends on their willingness to satisfy men’s desires. This effect would seem to be unrelated to viewers’ gender. Male adolescents enter into a kind of loop with a reinforcing positive feedback between the use of SEIM and their objectifying notion of women. Females, on the other hand, are heavily influenced in the perception of themselves and their own behaviours by seeing other women starring in mainly violent pornography ^(20,26). A recent Australian qualitative study of 33 young subjects aged 15-20 years shows that young women mainly express feelings of disgust and distress after watching pornographic material that celebrates gender inequality and shows degrading and possibly painful scenes for female protagonists ⁽²⁷⁾. The study performed by van Oosten (2016) in 1765 participants aged 13-17 years confirms the relationship between the use of SEIM and the aforementioned concepts of hypergendered orientation and sexual uncertainty ⁽¹³⁾. Stereotyped contents proposed by pornography might set a new benchmark and contribute to the development of unrealistic expectations and insecurities. For boys, the tendency towards emulation gives rise to anxiety and worries about their sexual performance, considered as though it was a mere athletic gesture. Young women often admit feeling pressure because of the role they feel they have to comply with ⁽²⁸⁾. At the same time, SEIM also influences the self-perception of body image ⁽¹⁴⁾. As confirmed by Doornward *et al.* (2014) in a sample of 1132 Dutch adolescents, pornographic

visual stimuli inspire a dysfunctional notion of physicality, thus fueling insecurities and dissatisfaction with their own physical appearance ⁽²⁹⁾. A previous longitudinal study by Peter & Valkenburg had shown an even stronger effect on males than females ⁽³⁰⁾.

The pressure to emulate sexual acts depicted in pornography and the assimilation to stereotyped gender roles easily promote new behavioral rules based on violence, submission, sexism and gender inequality, to the detriment of mutual respect and shared pleasure ⁽²⁷⁾. The role of pornography in generating sexually aggressive behaviours has long been debated. Although much of the available research focused on adult age, literature addressing this issue in minors is lacking and outdated ⁽¹¹⁾. A 2007 study of 804 adolescents in Northwest Italy had already shown a correlation between exposure to SEIM and positive attitudes toward sexual coercion ⁽³¹⁾. In a setting where minors can hardly balance negative cues with real-life experience and are most likely to assimilate distorted notions of sexuality and behave accordingly, those who actively look for violent pornographic contents have a six-fold increased risk of being sexually aggressive compared to unexposed peers ⁽³²⁾. The effect is relevant and consistent especially for a sub-population of subjects with a predisposition for sexual aggressiveness (*sexually reactive children and adolescents*, SRCA). The increased susceptibility of these individuals makes them more likely to engage in coerced intercourse and generally to accept the idea of violence against women ⁽³³⁾.

The impact of explicitly violent pornography is relevant but limited to this niche category. What is even more worrisome is the presence of objectifying and degrading content in mainstream pornography, which may contribute to establish aggressive attitudes and disinhibit violent behaviours ⁽³⁴⁾. This was investigated by the recent meta-analysis by Wright *et al.* ⁽³⁵⁾ addressing sexual aggressiveness in relation to several factors. The analysis of a pooled sample of 20820 individuals shows an equal distribution of the phenomenon between males and females. Indeed, repeated exposition and normalization of this type of content would lead girls to identify with aggressive female models too ⁽³⁶⁾. Age does not appear to be a moderating variable either, as both adolescents and young adults are equally affected and identify their respective peers as targets of

aggression ⁽³⁷⁾. More importantly, consumption of pornography results to be associated with sexually aggressive behaviours regardless of the nature of content and the displayed level of violence ⁽³⁵⁾. In the worst-case scenario, the internalization of violent sexual models might also contribute to the spread of BDSM (*Bondage, Dominance, Sadism and Masochism*). In Western countries, several deaths due to auto-erotic asphyxiation or erotic asphyxiation during consensual intercourse have been documented for adolescents too ⁽³⁸⁾.

Online pornography influences several aspects of minors' psychosocial development. Previous literature reviews have linked consumption of SEIM to lower degrees of social integration, behavioural problems or even criminal attitude, a higher incidence of depression symptoms ^(1,11). There is also a high risk of developing "sexual preoccupation", defined by Peter & Valkenburg as "a strong cognitive engagement in sexual issues, sometimes at the exclusion of other thoughts" ⁽³⁹⁾. The frequency and invasiveness of sexual thoughts to the detriment of other cognitive aspects has been recently investigated by Donevan & Mattebo in a sample of 946 eighteen-year-olds. In their study, more than 50% of individuals consuming SEIM at least weekly claimed that they thought about sex most of the day, and 30% of daily consumers admitted watching pornography more than they wanted to ⁽²²⁾. In fact, preoccupation is closely related to an actual risk of addiction and compulsive SEIM use. A longitudinal study of 331 Dutch adolescents aged 11-17 years showed that low levels of global self-esteem and excessive interest in sexual issues predicted a compulsive use of SEIM and were also positively associated with depressive problems ⁽⁹⁾.

The impact of SEIM consumption on adolescent behaviour is not confined to sexual experimentation alone, but it reaches virtual life too. One of the current and emerging issues is sexting, i.e. the act of sharing messages having sexual contents, pictures or videos, which may or may not be explicit, via social networks and instant messaging technology ⁽⁴⁰⁾. The association between the two phenomena is now well-acknowledged ⁽⁴¹⁾. A recent study performed by Van Ouystel *et al.* in 329 adolescents (mean age 16.7 years) demonstrated an at least doubled risk of sending or receiving sexually explicit messages for pornography users ⁽⁴²⁾.

Discussion

The aim of the present study was to investigate the findings of the most recently published literature about minors' consumption of SEIM and its impact on their health in terms of behavioural, psychophysical and social development. As it turns out, scientific evidence produced during the past five years confirms what was already known. Beliefs, perceptions, attitudes and behaviours regarding minors' body image and sexuality are highly influenced by pornography. There is an evident need for education and prevention programs targeting this issue that are lacking at date, mainly because the problem has long been overlooked (non dovrebbe essere underlooked?) and underestimated (Figure 1).

Feeling curiosity about sexuality is a physiological step in the developmental process of every minor. In societies where access to sexually explicit content is extremely easy, especially on the web, encounters with pornography must almost be considered as a mandatory step during growth. Nonetheless, American Centers for Disease Control and Prevention (CDCs) define pornography as an “adverse childhood experience” ⁽⁴³⁾. For the reasons outlined above, the adverse impact of SEIM turns this issue into a matter of public health with consequences on sociocultural and health outcomes for individuals, families and communities. Considering the overwhelming amount of sexually explicit material that can be found online and the ever-growing use of technology on behalf of the very young, eliminating pornography from their lives is ultimately impossible and all attempts in this direction have proved ineffective ⁽⁴⁴⁾. Nash *et al.* underline that “an effective policy solution needs to consider not just ‘how to limit children’s access’ but should also deal with the repercussions of their inevitable exposure to and uses of such sites” ⁽⁴⁵⁾.

In order to contain the risk of inadvertent exposure for children, some technical measures may be adopted by websites, social networks, Internet search engines and Internet providers. Most search engines offer options for safe browsing and are able to block pop-up ads, which are one of the most

prominent causes of unintended exposition to age-inappropriate content. However, many authors agree that despite the existence of legal bans for minors' use of adult sites and the implementation of these measures, it is concretely extremely difficult to block access ^(6,46). Although the web is indeed the major source of pornographic material, the problem can hardly be solved by simply adopting technical limitations. Instead, its deep social roots stress the importance of education and communication with parents, teachers and healthcare professionals ⁽⁴⁷⁾.

The literature divides strategies of parental approach in mainly two categories: restrictive mediation and active mediation ⁽⁴⁸⁾. Restrictive mediation mostly consists of defining rules about the use of Internet in terms of timing, setting and type of online activity, and possibly making use of the aforementioned technical aids. Active mediation, on the contrary, requires a sharper awareness from parents who qualify themselves as promoters of a safe and responsible use of Internet. This kind of mediation seems to be favoured by Italian parents (56%) and mostly chosen when dealing with younger boys and girls ⁽⁴⁹⁾. These mediation strategies have been shown their effectiveness in contrasting the use of SEIM, and many studies confirm that careful parental control and supervision remain key protective factors ^(29,41). Pornography is not an isolated social phenomenon, and parents must be made aware of this issue in order to understand the importance of creating in their family environment a chance for discussing about sexuality. At the same time, they ought to be tutored along this path so as to avoid feeling ill-prepared and scared of addressing such a delicate issue ⁽⁴⁴⁾. Caring for adolescents' health includes educating parents about the power of sexual media and teaching them how to acknowledge potentially dangerous sexual contents, limit exposure for their children and further elaborate on how the influence that pornography may have on their welfare ^(21,47).

The primary goal of education about pornography and sex education in general is to allow minors to develop consciousness and critical thinking skills and make them prepared for the encounter with sexually explicit material. Without this provision of knowledge and skills, the negative impact on children and adolescents can hardly be avoided and may contribute to generate misleading

interpretations and unrealistic expectations about sex, as thoroughly explained ⁽²¹⁾. It is not frequent that miseducational models proposed by pornography are appropriately balanced by education received in family and schools, as it happens for violent behaviours. In Italy, sex education is not compulsory in schools at present. Only 31% of adolescents aged 12-18 years have dealt with this issue in their classroom, and the percentage drops to 9% for children in primary schools ⁽⁴⁶⁾. Multidimensional interventions and projects based on peer education for adolescents in schools are a precious tool. Because contact with pornography now happens precociously, their implementation might be considered at all school stages ⁽⁴⁵⁾.

Healthcare professionals, especially Paediatricians, should play a fundamental role by sharing knowledge, promoting prevention strategies and giving support to parents and kids. As the American College of Pediatricians states, “healthcare professionals (are urged) to communicate the risks of pornography use to patients and their families and to offer resources both to protect children from viewing pornography and to treat individuals suffering from its negative effects” ⁽⁵⁰⁾. At the moment they appear to be largely unprepared and ill-equipped to face these issues. Including targeted educational and training programs in their curricula will be of utmost importance in the near future.

Conclusion

Pornography permeates the web, and both deliberate access and inadvertent exposure to it are steadily increasing. The harmful impact that consumption of SEIM has on minors' health in terms of behavioural, psychophysical and social outcomes is concrete and confirmed by the latest research. As the present analysis outlines, a frequent use of online pornography increases the likelihood of early sexual debut, positive attitudes toward multiple and/or casual partners, experimenting with depicted sexual acts, unprotected sex, distorted gender orientations, insecurities and dissatisfaction about one's own body image, depression symptoms, assimilation to aggressive models, sexting, obsessive interest and compulsive use of pornography. The issue can no longer be neglected and must be targeted by global and multidisciplinary interventions. Pornography must be prevented from becoming a primary source of information and a role model that defines minors' identity and sexuality. Education and empowerment of healthcare professionals will allow them to raise their awareness and responsibility towards children, adolescents and their families.

References

1. Bobkowski PS, Shafer A, Ortiz RR. Sexual intensity of adolescents' online self-presentations: Joint contribution of identity, media consumption, and extraversion. *Comput Human Behav* 2016;58:64-74.
2. Romito P, Beltramini L. Factors Associated With Exposure to Violent or Degrading Pornography Among High School Students. *J Sch Nurs* 2015;31:280-90.
3. Collins RL, Strasburger VC, Brown JD, Donnerstein E, Lenhart A, Ward LM. Sexual Media and Childhood Well-being and Health. *Pediatrics* 2017;140:S162-6.
4. Shafer A, Bobkowski PS, Brown JD. Sexual media practice: how adolescents select, engage with, and are affected by sexual media. In Gill KE, editor. *The Oxford handbook of Media psychology*. New York, NY: Oxford University Press; 2013. pp. 223-251.
5. O'Sullivan LF. Linking online sexual activities to health outcomes among teens. *New Dir Child Adolesc Dev* 2014;144:37-51.
6. Dines G. Growing Up With Porn: The Developmental and Societal Impact of Pornography on Children. *Dignity* 2017;2(3):1-9.
7. Gola M, Wordecha M, Sescousse G, Lew-Starowicz M, Kossowski B, Wypych M, *et al.* Can Pornography be Addictive? An fMRI Study of Men Seeking Treatment for Problematic Pornography Use. *Neuropsychopharmacology* 2017;42:2021-31.
8. Sniewski L, Farvid P, Carter P. The assessment and treatment of adult heterosexual men with self-perceived problematic pornography use: A review. *Addict Behav* 2018;77:217-24.
9. Doornwaard SM, van den Eijnden RJ, Baams L, Vanwesenbeeck I, ter Bogt TF. Lower Psychological Well-Being and Excessive Sexual Interest Predict Symptoms of Compulsive Use of Sexually Explicit Internet Material Among Adolescent Boys. *J Youth Adolesc* 2016;45:73-84.

10. Belton E, Hollis V. A review of the research on children and young people who display harmful sexual behaviour online. NSPCC Evaluation Department: Impact and Evidence series; 2016.
11. Peter J, Valkenburg PM. Adolescents and Pornography: A Review of 20 Years of Research. *J Sex Res*. 2016;53:509-31.
12. Peter J, Valkenburg PM. Adolescents' exposure to sexually explicit Internet material, sexual uncertainty, and attitudes toward uncommitted sexual exploration: Is there a link? *Commun Res* 2008;35:579-601.
13. van Oosten JMF. Sexually Explicit Internet Material and Adolescents' Sexual Uncertainty: The Role of Disposition-Content Congruency. *Arch Sex Behav* 2016;45:1011-22.
14. Löfgren-Mårtenson L, Månsson S. Lust, love, and life: A qualitative study of Swedish adolescents' perceptions and experiences with pornography. *J Sex Res* 2010;47:568-79.
15. Peter J, Valkenburg PM. Processes underlying the effects of adolescents' use of sexually explicit Internet material: The role of perceived realism. *Commun Res* 2010;37:375-99.
16. Braun-Courville DK, Rojas M. Exposure to sexually explicit web sites and adolescent sexual attitudes and behaviors. *J Adolesc Health* 2009;45:156-62.
17. Brown JD, L'Engle KL. X-Rated: Sexual attitudes and behaviors associated with U.S. early adolescents' exposure to sexually explicit media. *Commun Res* 2009;36:129-51.
18. Vandenbosch L, Eggermont S. Sexually explicit websites and sexual Initiation: Reciprocal relationships and the moderating role of pubertal status. *J Res Adolesc* 2013;23:621-34.
19. Bulot C, Leurent B, Collier F. Pornography sexual behaviour and risk behaviour at university. *Sexologies* 2015;24:e78-e83.
20. Owens EW, Behun RJ, Manning JC, Reid RC. The Impact of Internet Pornography on Adolescents: A Review of the Research. *Sex Addict Compulsivity* 2012;19:99-122.
21. Martellozzo E, Monaghan A, Adler JR, Davidson J, Leyva R, Horvath MAH. "I wasn't sure it was normal to watch it..." A quantitative and qualitative examination of the impact of

- online pornography on the values, attitudes, beliefs and behaviours of children and young people. London: Middlesex University; 2016.
22. Donevan M, Mattebo M. The relationship between frequent pornography consumption, behaviours, and sexual preoccupation among male adolescents in Sweden. *Sex Reprod Healthc* 2017;12:82-7.
 23. Smith LW, Liu B, Degenhardt L, Richters J, Patton G, Wand H *et al*. Is sexual content in new media linked to sexual risk behaviour in young people? A systematic review and meta-analysis. *Sex Health* 2016;13:501-15.
 24. Franczyk K, Cielecka E, Tuszyńska-Bogucka W. Porn on Desktop. *Procedia Soc Behav Sci* 2014;140:192-6.
 25. Cookingham LM, Ryan GL. The Impact of Social Media on the Sexual and Social Wellness of Adolescents. *J Pediatr Adolesc Gynecol* 2015;28:2-5.
 26. Koletić G. Longitudinal associations between the use of sexually explicit material and adolescents' attitudes and behaviors: A narrative review of studies. *J Adolesc* 2017;57:119-33.
 27. Walker S, Temple-Smith M, Higgs P, Sanci L. 'It's always just there in your face': young people's views on porn. *Sex Health* 2015;12:200-6.
 28. Peter J, Valkenburg PM. The influence of sexually explicit Internet material and peers on stereotypical beliefs about women's sexual roles: Similarities and differences between adolescents and adults. *Cyberpsychol Behav Soc Netw* 2011;14:511-7.
 29. Doornwaard SM, Bickham DS, Rich M, Vanwesenbeeck I, van den Eijnden R, ter Bogt T. Sex-Related Online Behaviors and Adolescents' Body and Sexual Self-Perceptions. *Pediatrics* 2014;134:1103-10.
 30. Peter J, Valkenburg PM. Does exposure to sexually explicit Internet material increase body dissatisfaction? A longitudinal study. *Comput Human Behav* 2014;36:297-307.

31. Bonino S, Ciairano S, Rabaglietti E, Cattelino E. Use of pornography and self-reported engagement in sexual violence among adolescents. *Eur J Dev Psychol* 2007;3:265-88.
32. Ybarra ML, Mitchell KJ, Hamburger M, Diener-West M, Leaf PJ. X-rated material and perpetration of sexually aggressive behavior among children and adolescents: Is there a link? *Aggressive Behavior* 2011;37:1-18.
33. Alexy EM, Burgess AW, Prentky RA. Pornography use as a risk marker for an aggressive pattern of behavior among sexually reactive children and adolescents. *J Am Psychiatr Nurses Assoc* 2009;42:442-53.
34. Wright PJ, Tokunaga RS. Men's Objectifying Media Consumption, Objectification of Women, and Attitudes Supportive of Violence Against Women. *Arch Sex Behav* 2016;45:955-64.
35. Wright PJ, Tokunaga RS, Kraus A. A Meta-Analysis of Pornography Consumption and Actual Acts of Sexual Aggression in General Population Studies. *J Commun* 2016;66:183-205.
36. Wright PJ. Mass media effects on youth sexual behavior. *Commun Yearb* 2011;35:343-86.
37. Felson RB, Cundiff PR. Sexual assault as a crime against young people. *Archives of Sexual Behavior* 2014;43:273-84.
38. Madea B, Hagemeier L. Death by erotic asphyxiation (breath control play). *Arch Kriminol* 2013;231:38-45.
39. Peter J, Valkenburg PM. Adolescents' exposure to sexually explicit Internet material and sexual preoccupation: A three-wave panel study. *Media Psychol* 2008;11:207-34.
40. Pellai A, Erba S, Ciampelli A, Iemmi D, Bronzin S, Capobussi M, *et al.* Epidemiology of sexting. *Minerva Pediatr* 2015;67:1-9.
41. Tomić I, Burić J, Štulhofer A. Associations Between Croatian Adolescents' Use of Sexually Explicit Material and Sexual Behavior: Does Parental Monitoring Play a Role? *Arch Sex Behav*; 2017 Oct 25.

42. Van Ouytsel J, Ponnet K, Walrave M. The associations between adolescents' consumption of pornography and music videos and their sexting behavior. *Cyberpsychol Behav Soc Netw* 2014;17:772-8.
43. Center for Disease Control and Prevention. "Adverse Childhood Experiences". <https://www.cdc.gov/violenceprevention/acestudy>
44. Puglia R, Glowacz F. Pornography consumption in adolescence: What representations of sexuality and pornography, for what sexuality? *Neuropsychiatr Enfance Adolesc* 2015;63:231-37.
45. Nash V, Adle JR, Horvath MAH, Livingstone S, Marston C, Owen G, *et al.* Identifying the Routes by which Children View Pornography Online: Implications for Future Policy-makers Seeking to Limit Viewing. Report of Expert Panel for DCMS; 2015.
46. Corbetta F, Maurino S, Scandroglio F, Liverani C, Mezzanzanica M. Spett-ATTORI del web. Indagine Telefono Azzurro - Doxakids. Doxakids; 2018.
47. Pizzol D, Bertoldo A, Foresta C. Adolescents and web porn: a new era of sexuality. *Int J Adolesc Med Health*. 2016;28:169-73.
48. Mascheroni G, Ólafsson K. Net Children Go Mobile: risks and opportunities. 2nd Edition. Milano: Educatt; 2014.
49. Forresi B, Guidi P, Scandroglio F, Liverani C, Zacco F. Il tempo del web: adolescenti e genitori online. Indagine Telefono Azzurro - Doxakids. Doxakids; 2016.
50. American College of Pediatricians. The Impact of Pornography on Children; 2016.

Notes

Conflict of interest: The authors report no conflicts of interest.

Authors' contributions:

NP: literature search, data collection and interpretation, manuscript drafting.

PM: literature search, data collection and interpretation, manuscript drafting.

LG: literature search, data collection and interpretation, manuscript drafting.

DC: literature search, data collection and interpretation.

LC: literature search, data collection and interpretation.

AP: study plan, critical review of the manuscript.

All listed authors approved the final draft submitted.

Titles of figures

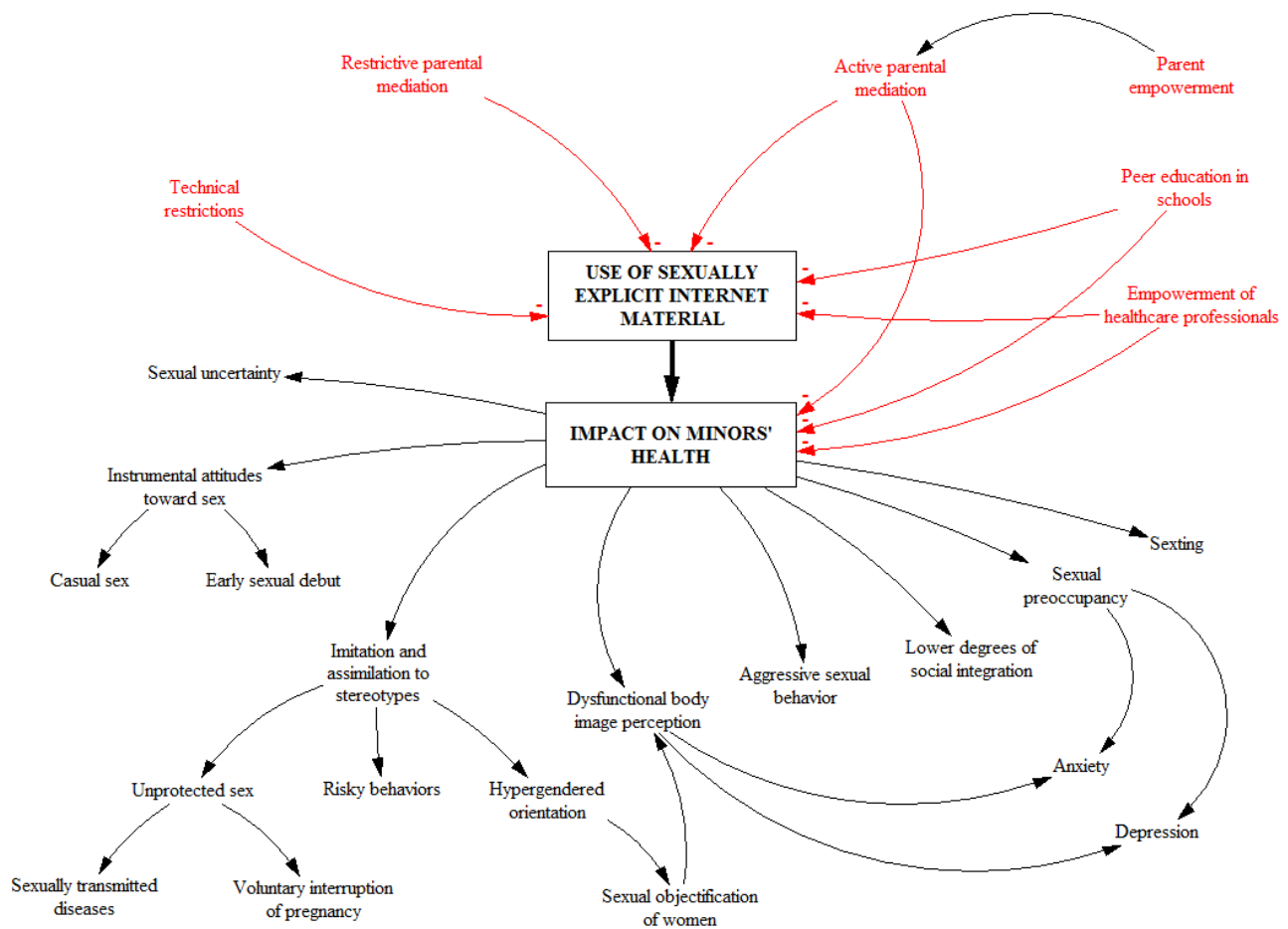


Figure 1. Proposed synoptic model to illustrate the potential negative consequences of use of sexually explicit internet material (SEIM) on minors' health. Several behavioural, psychophysical and social outcomes appear to be influenced by SEIM. Compared to technical restrictions and restrictive parental mediation, educational and preventive strategies including active parental mediation, peer education in schools and empowerment of healthcare professionals offer a global and omni-comprehensive approach.